10.10: Rationalizing Binomial Denominators

* Conjugates: a conjugate is a binomial that differs only by the connecting sign

  Ex: the conjugate of $a+b$ is $a-b$

  " " " $2-3\sqrt{5}$ is $2+3\sqrt{5}$

* When you (x) an irrational binomial by its conjugate you result in a rational product.

Process: Rationalizing Binomial Denom.

1) (x) num. and denom. by the conjugate of the denom.

   - num: distribute or FOIL
   - denom: FOIL

2) Simplify resulting fraction

Ex: rationalize: $\frac{5}{4+\sqrt{6}}$

Ex: rationalize and simplify: $\dfrac{1+\sqrt{5}}{3-\sqrt{5}}$

Chapter 10.pdf - Adobe Reader

File Edit View Window Help

43 / 56 150% Tools Comment

EXERCISES WITH OPEN-RESPONSE PROBLEMS

In 1–45, rationalize the denominator of each fraction. If possible, simplify the result.

1. $\frac{1}{\sqrt{7}}$	**2.** $\frac{9}{\sqrt{2}}$	**3.** $\frac{8}{\sqrt{5}}$	**4.** $\frac{15}{\sqrt{10}}$	**5.** $\frac{3}{\sqrt{6}}$
6. $\frac{6}{\sqrt{3}}$	**7.** $\frac{4}{\sqrt{18}}$	**8.** $\frac{6}{\sqrt{8}}$	**9.** $\frac{15}{\sqrt{50}}$	**10.** $\frac{6}{\sqrt{27}}$
11. $\frac{4}{\sqrt{48}}$	**12.** $\frac{3}{2\sqrt{2}}$	**13.** $\frac{3}{2\sqrt{3}}$	**14.** $\frac{9}{4\sqrt{6}}$	**15.** $\frac{10}{3\sqrt{20}}$
16. $\frac{5\sqrt{2}}{\sqrt{5}}$	**17.** $\frac{\sqrt{6}}{4\sqrt{2}}$	**18.** $\frac{3\sqrt{8}}{4\sqrt{18}}$	**19.** $\frac{2}{\sqrt[3]{16}}$	**20.** $\frac{4\sqrt[3]{3}}{3\sqrt[3]{2}}$
21. $\frac{5}{2-\sqrt{3}}$	**22.** $\frac{4}{3+\sqrt{2}}$	**23.** $\frac{1}{4+\sqrt{5}}$	**24.** $\frac{5}{4+\sqrt{6}}$	**25.** $\frac{6}{4-\sqrt{10}}$
26. $\frac{9}{5-\sqrt{13}}$	**27.** $\frac{6}{\sqrt{7}+2}$	**28.** $\frac{4}{\sqrt{15}-3}$	**29.** $\frac{4}{\sqrt{5}-3}$	**30.** $\frac{11}{\sqrt{3}-5}$
31. $\frac{12}{\sqrt{17}+5}$	**32.** $\frac{\sqrt{7}}{3-\sqrt{7}}$	**33.** $\frac{\sqrt{3}}{\sqrt{3}+1}$	**34.** $\frac{2\sqrt{5}}{\sqrt{5}-1}$	**35.** $\frac{\sqrt{2}}{2-\sqrt{2}}$
36. $\frac{2+\sqrt{3}}{4-\sqrt{3}}$	**37.** $\frac{6-\sqrt{7}}{5-\sqrt{7}}$	**38.** $\frac{1+\sqrt{11}}{4-\sqrt{11}}$	**39.** $\frac{1+\sqrt{5}}{3-\sqrt{5}}$	**40.** $\frac{1+\sqrt{3}}{3-\sqrt{3}}$
41. $\frac{1+\sqrt{5}}{5+\sqrt{5}}$	**42.** $\frac{\sqrt{10}-3}{\sqrt{10}-2}$	**43.** $\frac{\sqrt{7}+\sqrt{3}}{\sqrt{7}-\sqrt{3}}$	**44.** $\frac{5\sqrt{2}+1}{2\sqrt{2}-1}$	**45.** $\frac{\sqrt{12}-2}{\sqrt{3}-1}$

Pg 421:
3-60 ÷3

In 46–53, in each case: **a.** Use a calculator to find an approximate value of the given fraction to the *nearest ten-thousandth*. **b.** Write the given fraction as an equivalent fraction with a rational denominator.

c. Use a calculator to find the value of the fraction in part **b** to the *nearest ten-thousandth*

8.49 x 10.99 in